

CLAIMS

1. A turbomolecular vacuum pump having active magnetic bearings, the pump comprising an enclosure (110) defining a primary vacuum chamber (116), a rotor (120) mounted inside the enclosure (110), an electric motor (107) for rotating the rotor (120) relative to the enclosure (110), at least one axial magnetic bearing (103), and at least one radial magnetic bearing (101, 102) for supporting the rotor (120) relative to the enclosure (110), at least one axial detector (106) for detecting the axial position of the rotor (120) relative to the enclosure (110), at least one radial detector (104, 105) for detecting the radial position of the rotor (120) relative to the enclosure (110), a hermetic leaktight electrical connector (180) mounted in the wall of the enclosure (110), and at least one electric cable (183, 184) providing a connection with remote external electric circuits associated with the electric motor (107), and with the axial and radial magnetic bearings (103 and 101, 102),

the pump being characterized in that the remote external electric circuits associated with the electric motor (107) and with the axial and radial magnetic bearings (103 and 101, 102) essentially comprise general power supply circuits (191) for electrically powering the electric motor (107) and the axial and radial magnetic bearings (103 and 101, 102), in that circuits (194) for controlling the axial and radial magnetic bearings (103 and 101, 102) on the basis of signals issued by the axial and radial detectors (106 and 104, 105) are embedded in a resin and placed inside the enclosure (110) in the primary vacuum chamber (116), and in that the leaktight electrical connector (180) and the electric cable (183, 184) providing a connection with the remote external electric circuits (191, 192) each comprises a number of connection wires that is less than ten.

2. A turbomolecular vacuum pump according to claim 1, characterized in that the remote external electric circuits further comprise circuits (192) providing a communications interface with a system external to the vacuum pump.

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3. A turbomolecular vacuum pump according to claim 1 or claim 2, characterized in that it includes circuits (193) for controlling the electric motor that are mounted on a bottom plate (202) of the enclosure (110) on the outside thereof, in that the connection electric cable (183, 184) comprises a first connection cable (184) between the leaktight electrical connector (180) and the circuits (193) for controlling the electric motor, and a second connection cable (183) between the circuits (193) for controlling the electric motor and the remote external electric circuits (191, 192), and in that the first connection cable (184) has a number of connection wires that is less than ten, while the second connection cable (183) has a number of connection wires that is less than five.

4. A turbomolecular vacuum pump according to claim 3, characterized in that the first connection cable (184) has a number of connection wires that is less than eight, while the second connection cable (183) has a number of connection wires that is less than four.

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5. A turbomolecular vacuum pump according to any one of claims 1 to 4, characterized in that the circuits (194) for controlling the axial and radial magnetic bearings (103 and 101, 102) are placed in the bottom of the enclosure (110).

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6. A turbomolecular vacuum pump according to any one of claims 1 to 5, characterized in that a cooling circuit (203) external to the pump surrounds a portion of the enclosure (110) housing the circuits (194) for controlling the axial and radial magnetic bearings (103 and 101, 102).

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7. A turbomolecular vacuum pump according to any one of claims 1 to 6, characterized in that the circuits (194) for controlling the axial and radial magnetic bearings (103 and 101, 102) include a plate (208) having a bottom face facing
5 towards the wall of the enclosure (110) and carrying power components for powering the axial and radial magnetic bearings (103 and 101, 102), and a top face facing towards the inside of the enclosure (110) and carrying components for processing signals issued by the axial and radial detectors (106 and 104,
10 105).

8. A turbomolecular vacuum pump according to any one of claims 1 to 7, characterized in that the circuits (194) for controlling the axial and radial magnetic bearings (103 and
15 101, 102) are placed in an aluminum housing.

9. A turbomolecular vacuum pump according to any one of claims 1 to 8, characterized in that the circuits (194) for controlling the axial and radial magnetic bearings (103 and
20 101, 102) are mounted on a removable bottom plate (202) of the enclosure (110), inside the enclosure.

10. A turbomolecular vacuum pump according to claim 3 or claim 9, characterized in that the bottom plate of the
25 enclosure (110) is made of aluminum.

11. A turbomolecular vacuum pump according to any one of claims 1 to 10, characterized in that it has two radial magnetic bearings (101, 102) disposed on either side of the
30 electric motor (107).